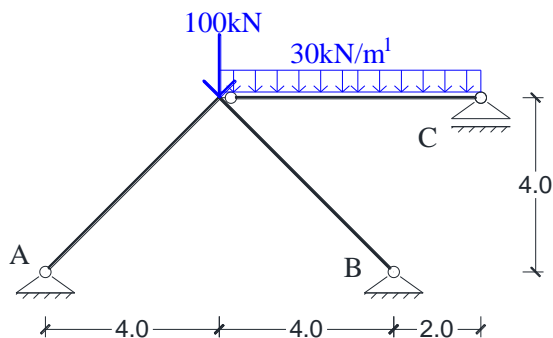


STATIKA KONSTRUKCIJA 1 - VEŽBE

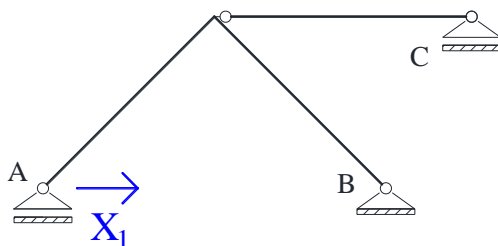
Zadatak: Za nosač i opterećenje prema skici odrediti dijagram vertikalnog pomeranja označenog poteza sa ordinatama na svakih 1m. Uticaj normalnih sila na deformaciju zanemariti. $E = 3 \cdot 10^7 \text{ kN/m}^2$. Svi štapovi su poprečnog presjeka 20/40cm.



1. Statička neodređenost nosača

$$n = Z_s + Z_k + Z_o + Z_u - 2K = 3 + 1 + 5 + 0 - 2 \cdot 4 = 1 \text{ x stat. neodređen nosač}$$

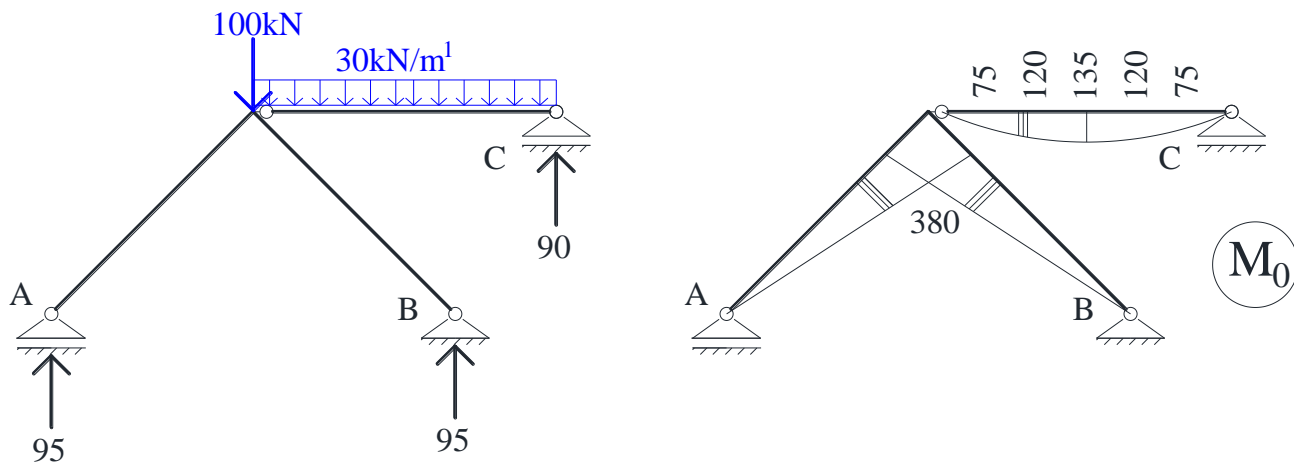
2. Izbor osnovnog sistema



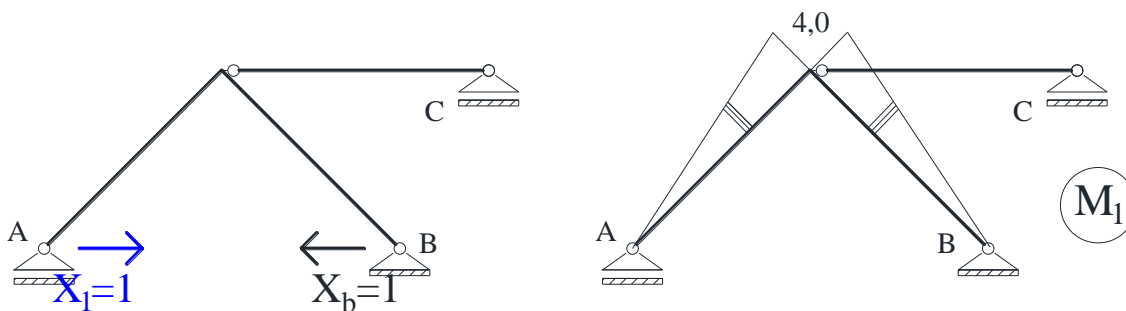
3. Redukovane dužine

$$I_c = I, \quad l' = l, \quad EI_c = 3 \cdot 10^7 \frac{0.2 \cdot 0.4^3}{12} = 32000 \text{ kNm}^2$$

4. Uticaji usled datog opterećenja



5. Uticaji usled stanja $X_1=1$



6. Koeficijenti uz nepoznate

$$EI_c \delta_{11} = \frac{2}{3} \cdot 4 \cdot 4 \cdot 5,657 = 60,34$$

7. Slobodni clan

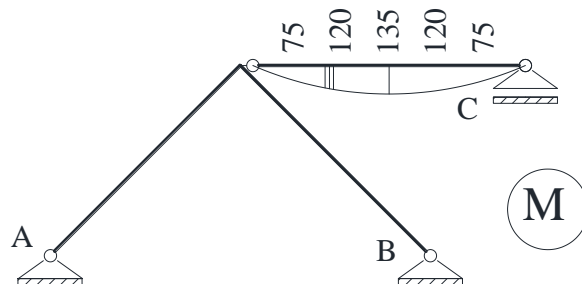
$$EI_c \delta_{10} = -\frac{2}{3} \cdot 4 \cdot 380 \cdot 5,657 = -5732,28$$

8. Statički neodređena veličina

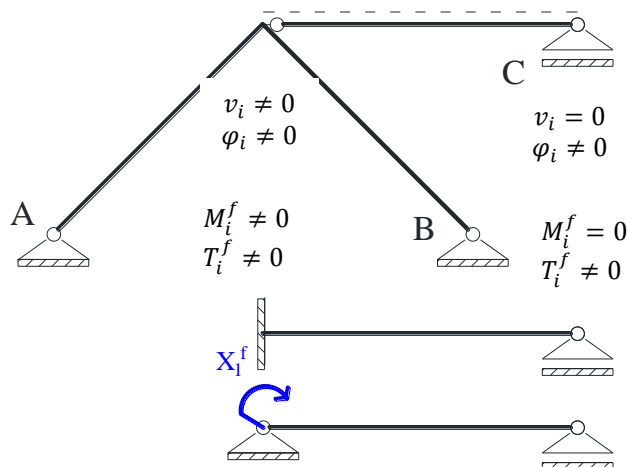
$$\delta_{10} + \delta_{11} X_1 = 0 \rightarrow X_1 = \frac{5732,28}{60,34} = 95 \text{ kN}$$

9. Dijagram momenata savijanja

$$M = M_0 + M_1 X_1$$



10. Određivanje fiktivnog nosača

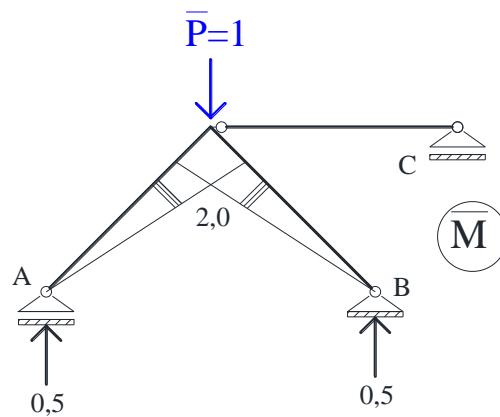


1 x statički neodređen fiktivni nosač

Osnovni sistem fiktivnog nosača

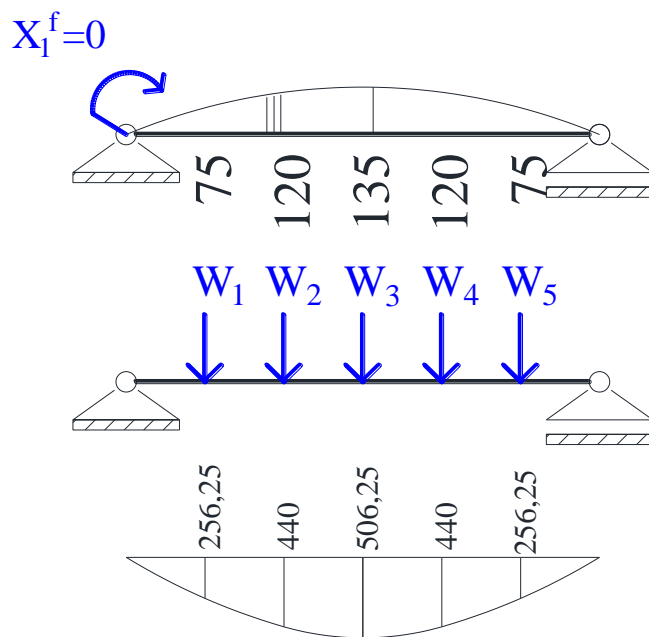
- Proračun X_1^f

$$EIc X_1^f = \int M\bar{M} l' = 0$$



- Fiktivno opterećenje

$$p^f = \left(\frac{M}{EI} + \alpha_t \frac{\Delta t}{h} \right) \frac{1}{\cos \alpha} \rightarrow EIp^f = M$$



$$EIM = EIv[m]$$

$$W_1 = W_5 = \frac{1}{12} (0 + 10 \cdot 75 + 120) = 72,5$$

$$W_2 = W_4 = \frac{1}{12} (75 + 10 \cdot 120 + 135) = 117,5$$

$$W_3 = \frac{1}{12} (120 + 10 \cdot 135 + 120) = 132,5$$